

## REGIONAL COMPETITION - ROUND 7

### TOSS-UP

1. ERSC; Multiple Choice: By what process is "Burnt lime" or CaO is obtained from limestone or CaCO<sub>3</sub>?
- a) Dehydration
  - b) Calcination
  - c) Pontification
  - d) Emulsification

ANSWER: B--CALCINATION

### BONUS

1. ERSC; Multiple Choice: A Karst formation is:
- a) a system of caves
  - b) a meteor crater
  - c) an anthropological feature
  - d) a feature marking the terminal advance of a glacier

ANSWER: A--A SYSTEM OF CAVES

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### TOSS-UP

2. CHEM: Multiple Choice: The compound 2,3,7,8-tetrachlorodibenzo-p-dioxin is a derivative contaminant of which of the following?
- a) 1-triaoctanol
  - b) polychlorinated biphenyl
  - c) 2,4,5-trichlorophenoxyacetic acid
  - d) praseodymium oxalate

ANSWER: C--2,4,5-TRICHLOROPHENOXYACETIC ACID

### BONUS

2. CHEM: Multiple Choice: Which of the following is the byproduct of high temperature incineration of polychlorinated biphenyls?
- a) chloromethylated diphenyl oxide
  - b) 2,3,7,8-tetrachlorodibenzofuran
  - c) hexahydroxychlorhexane
  - d) 6-nitrobenzimidazole

ANSWER: B--2,3,7,8-TETRACHLORODIBENZOFURAN

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**TOSS-UP**

3. COMP; Short Answer: Name either of the original authors of the C programming language.

ANSWER: (BRIAN W.) KERNIGHAN OR (DENNIS M.) RITCHIE

**BONUS**

3. COMP; Multiple Choice: In C programming language the maximum value of an unsigned short integer is:

- a) 64000
- b) 65535
- c) 32767
- d) 65536

ANSWER: B--65535

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**TOSS-UP**

4. BIOL; Short Answer: What is the heaviest land bird native to North America?

ANSWER: THE TURKEY

**BONUS**

4. BIOL; Short Answer: What order of insects contains the most species?

ANSWER: COLEOPTERA (BEETLES)

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**TOSS-UP**

5. PHYS; Short Answer: Whose principle or law states that each point on a wavefront may be considered a new wave source?

ANSWER: HUYGEN (HUYGEN'S PRINCIPLE)

**BONUS**

5. PHYS; Short Answer: An organ pipe which is open at both ends resonates at its fundamental frequency. Neglecting any end effects, what wavelength is formed by this pipe in this mode of vibration if the pipe is 2 meters long?

ANSWER: 4 METERS

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**TOSS-UP**

6. GENR; Short Answer: What is the chemical formula for chalk?

ANSWER:  $\text{CaCO}_3$  (CALCIUM CARBONATE)

**BONUS**

6. GENR; Multiple Choice: What are the two precursors of "acid rain?"
- a)  $\text{CO}_2$  and  $\text{H}_2\text{O}$
  - b)  $\text{SO}_2$  and  $\text{N}_2$
  - c)  $\text{SO}_2$  and  $\text{NO}_x$
  - d)  $\text{NO}_x$  and  $\text{CO}_2$

ANSWER: C-- $\text{SO}_2$  AND  $\text{NO}_x$

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### TOSS-UP

7. CHEM: Multiple Choice: Pure SF-6 gas combines excellent electrical performance, as regards insulation and arc quenching. It has all of the following properties except:
- a) chemically unstable
  - b) non-toxic
  - c) odorless
  - d) incombustible

ANSWER: A-CHEMICALLY UNSTABLE

### BONUS

7. CHEM: Multiple Choice: In a galvanic reaction between steel and zinc, which answer is correct?
- a) steel is the cathode
  - b) zinc is the cathode
  - c) steel will corrode
  - d) none of the above

ANSWER: A--STEEL IS THE CATHODE

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### TOSS-UP

8. ASTR; Short Answer: What is the name of the hypothetical reservoir for long-period comets?

ANSWER: THE OORT CLOUD

### BONUS

8. ASTR; Multiple Choice: The fluctuations in the temperature of cosmic background radiation discovered by COBE occurred in what decimal value of a kelvin unit?
- a) tenths of a kelvin
  - b) hundredths of a kelvin
  - c) thousandths of a kelvin
  - d) millionths of a kelvin

ANSWER: D--MILLIONTHS OF A KELVIN

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**TOSS-UP**

9. BIOL; Short Answer: What is the largest aquatic bird?

ANSWER: THE ALBATROSS

**BONUS**

9. BIOL; Short Answer: What is the claim to fame of Louise Joy Brown, born July 25, 1978?

ANSWER: SHE WAS THE FIRST TEST TUBE BABY

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**TOSS-UP**

10. MATH; Multiple Choice: What is a danger which may be made in arriving at a decision about a null hypothesis?
- a) Rejecting the null hypothesis when in fact it is false
  - b) Accepting the null hypothesis when in fact it is true
  - c) Rejecting the null hypothesis when in fact it is true
  - d) None of the above

ANSWER: C--REJECTING THE NULL HYPOTHESIS WHEN IN FACT IT IS TRUE

**BONUS**

10. MATH; Multiple Choice: What is the probability of making a type II error?
- a) 1
  - b) alpha
  - c) .01
  - d) beta

ANSWER: D--BETA

**TOSS-UP**

11. PHYS; Multiple Choice: The wave nature of light is demonstrated by which of the following?
- a) the photoelectric effect
  - b) color
  - c) the speed of light
  - d) diffraction

ANSWER: D--DIFFRACTION

**BONUS**

11. PHYS; Short Answer: What is the name of the scientist after whom the second law of refraction of light is named, describing the relationship between the directions of incidence and refraction?

ANSWER: (WILLEBRORD) SNELL (DUTCH ASTRONOMER)

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**TOSS-UP**

12. CHEM: Short Answer: What is the red copper compound which precipitates when a mixture of Fehling solution and urine from a diabetic containing some sugar is heated?

ANSWER: COPPER OXIDE (CU<sub>2</sub>O)

**BONUS**

12. CHEM: Multiple Choice: Lead-acid storage batteries emit a gas while being charged. The gas emitted is:
- a) oxygen
  - b) hydrogen
  - c) hydrogen sulfide
  - d) none of the above

ANSWER: B--HYDROGEN

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**TOSS-UP**

13. COMP; Short Answer: Which three number bases are commonly associated with computers?

ANSWER: BASE 2 (BINARY), BASE 8 (OCTAL), AND BASE 16 (HEXADECIMAL)

**BONUS**

13. COMP; Short Answer: Convert the binary number 11011 to decimal.

ANSWER: 27 (TWENTY SEVEN)

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**TOSS-UP**

14. BIOL; Short Answer: What is the most common food of dragonflies?

ANSWER: MOSQUITOES

**BONUS**

14. BIOL; Short Answer: Which weed's name derives from the French for tooth of the lion?

ANSWER: THE DANDELION

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**TOSS-UP**

15. ASTR; Multiple Choice: What is the term for the lower atmosphere of the sun?
- a) Corona
  - b) Corolla
  - c) Photosphere
  - d) Chromosphere

ANSWER: D--PHOTOSPHERE

**BONUS**

15. ASTR; Multiple Choice: The largest arrangement of matter in the known universe consists of a superstructure of galaxies most often described in which of the following ways?
- a) equidistant galaxy clusters in all directions
  - b) equidistant galaxy clusters along a single plane
  - c) concentric rings of galaxy clusters
  - d) walls of galaxy clusters around great voids

ANSWER: D--WALLS OF GALAXY CLUSTERS AROUND GREAT VOIDS

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**TOSS-UP**

16. PHYS; Short Answer: What change in velocity will be caused by an impulse of 10 kilogram-meter per second acting on an object whose mass is 5 kilogram? velocity of:

ANSWER: 2 METERS PER SECOND

**BONUS**

16. PHYS: Short Answer: When a ray of sunlight is refracted by a prism, the visible result is a spectrum like the rainbow. What is the color of light resulting from the recombination of this light?

ANSWER: WHITE

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**TOSS-UP**

17. CHEM: Multiple Choice: Which of these metals has the highest melting point?

- a) Tungsten
- b) Thorium
- c) Titanium
- d) Tantalum

ANSWER: A--TUNGSTEN

**BONUS**

17. CHEM: Short Answer: Of CFC's, HCFC's and HFC's, which refrigerant has the lowest ozone depletion potential?

ANSWER: HFC's

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**TOSS-UP**

18. ERSC; Multiple Choice: A tornado is:

- a) spawned by sunspot activity
- b) characterized by low pressure
- c) characterized by high pressure
- d) sometimes associated with earthquakes

ANSWER: B--CHARACTERIZED BY LOW PRESSURE

**BONUS**

18. ERSC; Multiple Choice: Marble is a metamorphosed form of:

- a) quartz
- b) granite
- c) sandstone
- d) limestone

ANSWER: D-- LIMESTONE

**TOSS-UP**

19. GENR; Multiple Choice: What is the second largest fuel contributor to electricity production in the United States?
- a) Coal
  - b) Nuclear
  - c) Oil
  - d) Natural gas

ANSWER: D--NATURAL GAS

**BONUS**

19. GENR; Multiple Choice: Under what president was the department of Energy formed?
- a) Ford
  - b) Carter
  - c) Reagan
  - d) Nixon

ANSWER: B--CARTER

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**TOSS-UP**

20. PHYS; Short Answer: The time needed for a net force of 10 newtons to change the velocity of a 5 kilograms mass by 3 meters/second is:

ANSWER: 1.5 SECONDS

**BONUS**

20. PHYS; Short Answer: Who measured the value of G, the universal gravitational constant experimentally?

ANSWER: CAVENDISH

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**TOSS-UP**

21. BIOL; Short Answer: What was the first domesticated bird?

ANSWER: THE GOOSE

**BONUS**

21. BIOL; Short Answer: What is the most frequently broken bone in the body?

ANSWER: THE CLAVICLE OR COLLAR BONE

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**TOSS-UP**

22. CHEM: Multiple Choice: Which of the following elements is not a transuranic element?

- a) thorium
- b) neptunium
- c) americium
- d) plutonium

ANSWER: THORIUM

**BONUS**

22. CHEM: Multiple Choice: Which ancient scientist said that the world is made up of four basic elements?

- a) Archimedes
- b) Pythagoras
- c) Cavendish
- d) Demetrius

ANSWER: B--PYTHAGORAS

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**TOSS-UP**

23. PHYS; Short Answer: An electroscope charged WITHOUT contacting a charged body is charged by:

ANSWER: INDUCTION

**BONUS**

23. PHYS; Short Answer: The first instrument used for measuring temperature was the gas thermoscope invented by:

ANSWER: GALILEO

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**TOSS-UP**

24. MATH; Multiple Choice: Which of these is not an example of a nonparametric test?
- a) Binomial
  - b) McNemar
  - c) t
  - d) Sign

ANSWER: C--T

**BONUS**

24. MATH; Multiple Choice: What is an example of a two-sample nonparametric statistical test?
- a) Binomial
  - b) Sign
  - c) Kolmogorov-Smirnov
  - d) Double-down

ANSWER: B--SIGN

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**TOSS-UP**

25. BIOL; Short Answer: What is the winter counterpart to estivation?

ANSWER: HIBERNATION (OR BRUMATION)

**BONUS**

25. BIOL; Short Answer: How many hearts does an octopus have?

ANSWER: THREE

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